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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,029	04/01/2004	Garo J. Derderian	MI22-2444	2772
21567	7590	08/11/2005	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			LE, DUNG ANH	
			ART UNIT	PAPER NUMBER
			2818	
DATE MAILED: 08/11/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/817,029

Applicant(s)

DERDERIAN ET AL.

Examiner

DUNG A. LE

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) 16-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-53 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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DETAILED ACTION

Oath/Declaration

The oath/declaration filed on 4/1/2004 is acceptable.

Election/Restriction

Applicant provisionally elects to be examined the invention described as a Species I, e.g. claims 1-15: Method for forming a trench isolation region having steps of forming trench isolation material within the isolation trench and over the masking material outside of the trench effective to overfill the isolation trench and polishing the trench material (Figs. 1-5).

Applicants are reminded to cancelled non-elective claims 16-53.

Information Disclosure Statement

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on 4/1/2004 and made of record .

The references cited on the PTOL 1449 form have been considered.

Specification

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7-10 and 13- 15 are rejected under 35 USC 102 (b) as being anticipated by Ukeda et al. (6,069,055).

Ukeda et al. teach a method of forming a trench isolation region (figs. 2A- 2F and 4A-4F) comprising: forming a masking material 4 over a semiconductor substrate 1; the masking material 4 comprising at least one of tungsten, titanium nitride and amorphous carbon (col 5, lines 20-25, col 7, lines 1-4); forming an opening 5 through the masking material and into the semiconductor substrate effective to form an isolation trench within semiconductive material of the semiconductor substrate; forming trench isolation material 9 within the isolation trench 5 and over the masking material 4 outside of the

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trench effective to overfill the isolation trench; polishing the trench isolation material (col 4, line 55) at least to an outermost surface of the at least one of tungsten, titanium nitride and amorphous carbon of the masking material (fig. 2E) ; and etching the at least one of tungsten, titanium nitride and amorphous carbon from the substrate (fig. 2G).

Regarding claim 2, wherein the masking material comprises tungsten (col 5, lines 20-25, col 7, lines 1-4).

Regarding claim 7, the masking material comprises at least two of tungsten, titanium nitride and amorphous carbon (col 5 ,lines 20- 25).

Regarding claim 9, the semiconductive material comprises bulk substrate 1 monocrystalline silicon (col 3, line 45).

Regarding claim 10, the trench isolation material comprises silicon dioxide 9 (col 4, line 40).

Regarding claim 13, the etching is conducted selectively to at least some of the trench isolation material (figs. 2E-2D).

Regarding claim 14, the etching is conducted selectively to all of the trench isolation material (col 4, line 55).

Regarding claim 15, the masking material 4 (col 5, line 20-25) is void of silicon nitride.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-6, 8 and 11- 12 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Ukeda et al. in view of the following remark.

Regarding claim 3, Ukeda et al. discloses the claimed invention as applied to claim 1, including masking material comprises titanium silicide (col 7, line 2) or metallic alloy (col 8, line 8), except for the masking material comprises titanium nitride to form the mask.

It would have been obvious to one having ordinary skill in the art at the time the commonly used to prevent undesirable etching in the procedure for forming the trench, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended application.

Regarding claims 4- 6 and 8, Ukeda et al. discloses the claimed invention as applied to claim 1 and 7, except for the masking material comprises amorphous carbon, wherein the amorphous carbon comprising layer comprises at least one of boron and

nitrogen and wherein the amorphous carbon comprising layer is transparent to visible light.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the masking material comprises amorphous carbon, wherein the amorphous carbon comprising layer comprises at least one of boron and nitrogen and wherein the amorphous carbon comprising layer is transparent to visible light to form the mask is commonly used to prevent undesirable etching in the procedure for forming the trench, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the desired purpose.

Regarding claims 11 and 12, Ukeda et al. discloses the claimed invention as applied to claims 1 and 10, except for the trench isolation material comprise a layer comprising silicon nitride, at least some of the silicon dioxide being formed over the silicon nitride comprising layer and the at least some is formed on silicon nitride of the silicon nitride comprising layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the trench isolation material comprise a layer comprising silicon nitride, at least some of the silicon dioxide being formed over the silicon nitride comprising layer and the at least some is formed on silicon nitride of the silicon nitride comprising layer which is commonly used to enhance desirable etching in the procedure

for forming the trench, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the desired application.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The central fax phone numbers for the organization where this application or proceeding is assigned are (571)272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

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more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE
Primary Examiner
Art Unit 2818

A handwritten signature in black ink, appearing to read 'Dle', is positioned to the right of the typed name 'DUNG A. LE'.